

Claims

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1. A method for searching for compounds or mutations interacting directly or indirectly with the insulin signaling pathway, characterized in that a viable chico mutant insect is treated with at least one compound or with at least one mutation generating means, and that the effect of such treatment on the body size and/or cell size and/or development time and/or lipid level is determined whereby alterations of the body size and/or cell size and/or development time and/or lipid level are detectable in at least part of the animal.

2. The method of claim 1 characterized in that the viable chico mutant insect comprises at most one wild-type chico gene.

3. The method of claim 2 wherein the mutant is a Drosophila mutant and wherein said mutant is treated in the egg or larvae stadium with said compound or compound generating means.

4. The method of claim 2 or 3 wherein the mutant does not comprise a wild-type chico gene.

5. The method of claim 2 or 3 wherein the Drosophila mutant comprises one wild-type chico gene.

6. The method of claim 5 wherein the wild-type chico gene encodes the amino acid sequence of Table 1 (SEQ. ID. NO. 2, 3).

7. The method of claim 6, wherein the wild-type chico gene is the genomic or the cDNA sequence represented in Table 1 (SEQ. ID. NO. 1, 2) or Table 2 (SEQ. ID. NO. 4).

8. The method of anyone of claims 2 to 7 wherein the Drosophila mutant comprises at least one chico mutation with lacking or reduced activity compared to wild-type chico.

9. The method of claim 7 wherein the chico mutation is the mutation described in Figure 3A.

10. The method of anyone of claims 2 to 9 wherein the *Drosophila* lacks at least one *chico* gene.

11. The method of claim 10 wherein the mutant lacks both *chico* genes.

5 12. The method of anyone of claims 1 to 11 wherein the compound is a compound for the treatment of diabetes type 2.

10 13. The method of anyone of claims 1 to 12, wherein the alteration of the body size and/or the cell size and/or the development time and/or the lipid level is detectable in the whole animal.

15 14. The method of anyone of claims 1 to 12, wherein the alteration of the body size and/or the cell size and/or the development time and/or the lipid level is detectable in the head region only.

15. A viable insect mutant comprising at most one wild-type *chico* gene in at least a part of its body and said at least one part of the body shows reduced size.

20 16. The mutant of claim 15 that does not comprise as sole *chico* genes two *chico*<sup>1</sup> genes.

17. The mutant of claim 15 or 16 that does not comprise a wild-type *chico* gene.

25 18. The mutant of claim 15 or 16 that comprises one wild-type *chico* gene.

19. The mutant of claim 18 wherein the wild-type *chico* gene encodes the amino acid sequence of Table 1 (SEQ. ID. NO. 2, 3).

30 20. The mutant of claim 19, wherein the wild-type *chico* gene is the genomic or the cDNA sequence represented in Table 2 (SEQ. ID. NO. 4) or Table 1 (SEQ. ID. NO. 1, 2).

35 21. The mutant of anyone of claims 15 to 20 comprising at least one *chico* mutation with lacking or reduced activity compared to wild-type *chico*.

22. The mutant of claim 21 wherein the *chico* mutation is the mutation described in Figure 3A.

23. The mutant of anyone of claims 15 to 22 lacking at least one *chico* gene.

24. The mutant of claim 15 lacking both *chico* genes.

5 25. The mutant of anyone of claims 15 to 24 which is a fly mutant, in particular a *Drosophila* mutant.

26. The mutant of anyone of claims 15 to 25, wherein at most one wild-type *chico* gene is found in the whole body of the insect.

10 27. The mutant of anyone of claims 15 to 25, wherein at most one wild-type *chico* gene is found in the head region of the insect only.

28. Use of an insect according to anyone of claims 15 to 27 as a means in screening compounds for modulating diseases.

29. Use of an insect according to anyone of claims 15 to 27 as a means for searching for mutations involved directly or indirectly in the insulin signaling pathway.

20 30. Use according to claim 22 or 23, characterized in that the disease is diabetes type 2.

31. A method for generating a mutant insect, characterized in that adult animals, in particular males, are treated with a mutation generating means under mutation generating conditions, that thus treated insects are crossed to wild-type or mutant insects, in particular *chico* mutant insects, and that viable offsprings with altered cell number and /or cell size and/or developmental time and/or lipid levels are cultivated under suitable conditions.

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